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(54) Ink cartridge insertion mechanism for an ink jet printer

(57) An ink cartridge insertion mechanism for an ink jet printer is capable of absorbing ink that might leak from an ink supply needle (31) after an ink cartridge has been removed. The ink supply unit of the ink jet printer has an ink absorption and needle protection device (70) including an ink absorption material (74) for absorbing ink leaking from the ink supply needle (31) and/or from a waste ink needle (35) of the ink supply unit when no ink cartridge is installed. The ink absorption material (74) also protects the needles (31, 35). When an ink cartridge is inserted, a pivot plate (73) causes the entire ink absorption and needle protection device (70) to pivot away from the needles (31, 35) to a retracted position, thus exposing the needles and preventing any interference with ink cartridge loading. When the ink cartridge is subsequently removed, torsion springs (75, 76) urge the pivot plate (73) back to the original horizontal ink absorption position.

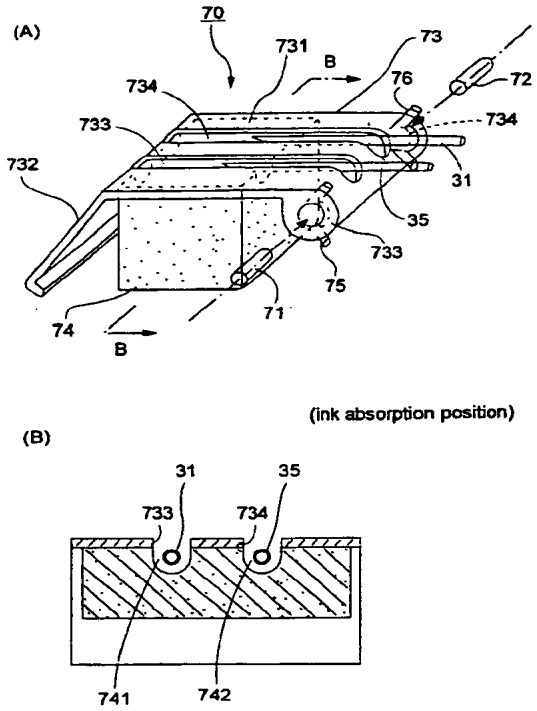

FIG. 7

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Description

[0001] The present invention relates to an ink jet printer in which an ink cartridge is used as an ink reservoir from which ink is supplied for printing, and relates particularly to a mechanism for inserting an ink cartridge into such an ink jet printer.

[0002] One common mechanism for inserting an ink cartridge to an ink jet printer (referred to as "ink cartridge insertion mechanism" below) requires sliding the ink cartridge into position on a cartridge holder of the ink jet printer such that an ink outlet piece in the ink cartridge is pierced by an ink supply needle disposed in the cartridge holder.

[0003] An ink cartridge insertion mechanism of this type is disclosed in JP-A-5-16378/1993. The ink cartridge described in this document comprises a flexible ink bag filled with ink, an ink outlet piece formed in the ink bag, and a rectangular, rigid plastic case for holding the ink bag. The ink outlet piece of the ink bag is exposed at the front end face of the plastic case. The ink cartridge is thus slid horizontally into the cartridge holder so that the ink supply needle in the cartridge holder is inserted into the ink outlet piece. In this prior art, when no ink cartridge is mounted on the cartridge holder, the ink supply needle is exposed in the opening of the cartridge holder through which the ink cartridge is inserted.

[0004] Such exposure of the unprotected tip of the ink supply needle can be dangerous because the tip is typically sharp, and can also subject the needle to damage when something is dropped thereon from the insertion opening in the holder. To avoid these problems, JP-A-5-16378/1993 teaches an ink cartridge insertion mechanism having a shutter disposed on the cartridge holder. This shutter opens when an ink cartridge is inserted into the opening, and closes again when the ink cartridge is removed such that when no ink cartridge is installed the shutter shields and protects the ink supply needle.

[0005] US-A-5,186,291 discloses an ink cartridge insertion mechanism of an ink jet printer employing a protection plate rotatably supported between first and second positions. In its first position the protection plate is in front of the tip of the ink supply needle. In its second position the protection plate is rotated toward the needle and the needle is exposed through a hole in the protection plate so as to be able to enter an ink cartridge. The protection plate is automatically moved from its first to its second position in conjunction with the inserting movement of the ink cartridge.

[0006] Ink jet printers are normally tested after they have been assembled in the factory and before shipment. In printers of the above mentioned kind this requires that an ink cartridge has to be actually loaded and the ink supply needle on the holder has to be inserted into the ink outlet piece of the cartridge. When the test is completed, the ink cartridge is removed and printers that have passed the test are then shipped. It will be obvious that this test method leaves an amount of ink in the ink supply path after the test. There is thus the possibility that this residual ink will leak from the tip of the ink supply needle during shipping. Such leakage can soil the area around the needle, and this soiling can lead to customer complaints.

[0007] It is therefore an object of the present invention to provide an ink cartridge insertion mechanism for an ink jet printer whereby residual ink that may leak from the ink supply needle when no ink cartridge is installed can be collected. It is another object of the invention to provide such ink cartridge insertion mechanism in which the ink supply needle is protected when no ink cartridge is installed.

[0008] This object is achieved with a mechanism as claimed in claim 1. Preferred embodiments of the invention are subject-matter of the dependent claims.

[0009] An ink cartridge insertion mechanism according to the present invention has movable ink absorption device for absorbing ink leaking from the ink supply needle. The type of ink jet printer in which such ink cartridge insertion mechanism is typically used commonly has a cartridge receiver to which an ink cartridge is installed by inserting the ink cartridge in the axial direction of the ink supply needle so that the ink supply needle is inserted into an ink outlet piece in the ink cartridge.

[0010] The ink absorption means is normally held in a first or ink absorption position when no ink cartridge is installed. When an ink cartridge is inserted and installed, the ink absorption means moves in conjunction with insertion operation to a second or retracted position at which it does not interfere with the ink cartridge insertion.

[0011] The ink absorption means is positioned to absorb any ink that might leak from the ink supply needle whenever no ink cartridge is installed in the printer. Ink leaking from the ink supply needle is thus collected by the ink absorption means, and the area around the ink supply needle will not be soiled by leaking ink. When an ink cartridge is inserted, the ink absorption means is moved in conjunction with ink cartridge insertion to the retracted position where it does not interfere with ink cartridge insertion. Providing such ink absorption means therefore does not create any inconvenience or problem with inserting and installing an ink cartridge.

[0012] The ink absorption means of the present invention is preferably also used as a means for protecting the ink supply needle so that the ink supply needle cannot be directly touched or damaged when no ink cartridge is installed.

[0013] The ink absorption means preferably comprises an ink absorption material and a pivot plate for supporting the ink absorption material. The pivot plate is pivotally mounted in the cartridge receiver so that it can pivot between the ink absorption position and the retracted position.

[0014] A spring is preferably provided for applying a resilient force to the pivot plate as a means of constantly

urging the pivot plate to and holding it in the ink absorption position. When an ink cartridge is inserted using the ink cartridge insertion mechanism thus comprised, the ink cartridge pushes the pivot plate against the force of the spring into the retracted position, and thereby moves the ink absorption material to a position where it can capture and collect any ink leaking out of the ink supply needle.

[0015] The pivot plate preferably has a slit through which the ink supply needle can pass when the pivot plate moves to the ink absorption position, and the ink absorption material is attached to a back side of the pivot plate. The ink absorption material has a recessed channel at a position corresponding to said slit for accepting the ink supply needle that passed through said slit. In this embodiment, the ink supply needle is effectively protected from the outside by the pivot plate and the ink absorption material when it is received in the recessed channel in the ink absorption material. As a result, the ink absorption material can both absorb any ink that might leak from the tip of the ink supply needle, and protect the ink supply needle, when no ink cartridge is installed.

[0016] To move the ink absorption means in conjunction with the inserting movement of an ink cartridge, the pivot plate preferably comprises at a leading edge thereof an engaging part via which the pivot plate is pushed toward the retracted position by an ink cartridge when the ink cartridge is being inserted.

[0017] An embodiment of the present invention is described below with reference to the accompanying figures.

Fig. 1 is an oblique view from the front of an ink jet printer in which an ink cartridge insertion mechanism according to the present invention is used.

Fig. 2 is an oblique view from the back of the ink jet printer shown in Fig. 1.

Fig. 3 is a schematic representation of the paper transport path in the ink jet printer shown in Fig. 1.

Fig. 4 (A) is a schematic view of the ink supply path in the ink jet printer shown in Fig. 1, and (B) is a partially exploded oblique view of an ink cartridge.

Fig. 5 (A) is an oblique view of the ink cartridge insertion mechanism before an ink cartridge is inserted into the cartridge holder, and (B) is a partial sectional view thereof.

Fig. 6 illustrates the ink cartridge insertion operation of the ink cartridge insertion mechanism shown in Fig. 5.

Fig. 7 shows the ink absorption and needle protection device assembled in the ink cartridge insertion mechanism shown in Fig. 5, Fig. 7(A) being an oblique view thereof illustrating the device in its ink absorption position, and Fig. 7(B) being a sectional view through line B-B in Fig. 7(A).

Fig. 8 also shows the ink absorption and needle protection device shown in Fig. 7, Fig. 8(A) being an oblique view thereof illustrating the device in its retracted position, and Fig. 8(B) being a front view thereof.

Overall configuration of an ink jet printer

[0018] Fig. 1 and Fig. 2 are oblique views from the front and back, respectively, of an ink jet printer comprising an ink cartridge insertion mechanism according to the present invention. Fig. 3 is a side sectional view showing the major elements of the paper transport path in the ink jet printer shown in Figs. 1 and 2.

[0019] As shown in these figures, in the illustrated embodiment the transportation path of ink jet printer 1 conducts the print medium from either a roll paper loading mechanism 2 or a paper supply opening 3 to a printing region 11 (indicated by a dot-dash line in Fig. 1). Roll paper 4 is supplied from the roll paper loading mechanism 2, and cut sheet paper (such as A4 size or other size) or slip form 5 is inserted into the paper supply opening 3. An ink jet head 8 is held on a carriage mechanism 9 in a position opposing roll paper 4 or slip form 5 as it passes the printing region 11.

[0020] The carriage mechanism 9 comprises a guide shaft 6, a carriage 7, and a motor (not shown in the figures) for driving the carriage 7. The carriage 7 is held in a manner enabling a reciprocating movement along the guide shaft 6 in a direction orthogonal to the direction in which roll paper 4 and slip form 5 are transported. The carriage 7 can thus move in two opposite directions (referred to as widthwise directions hereinafter) through an area containing the printing region 11.

[0021] A capping face 11C of a capping mechanism 11B is disposed at one lateral side of the printing region 11. The capping mechanism 11B is located at the position to which the ink jet head 8 is retracted when the printer is in a standby mode between printing operations and where the nozzles of the ink jet head 8 are effectively covered by the capping face 11C, thereby preventing the ink in the nozzles from drying.

[0022] Ink is supplied to the ink jet head 8 through an ink tube (not shown in the figures) from an ink supply unit 10, which is located beside the roll paper loading mechanism 2. As shown in Fig. 2, the ink supply unit 10 has a cartridge loader (receiver) 30 for loading and holding a replaceable ink cartridge 20.

Ink supply path and ink cartridge

[0023] An outline of an ink supply path for supplying ink to the ink jet head 8 is shown in Fig. 4 (A). An ink supply needle 31 and a waste ink needle 35 are provided in the cartridge loader 30 of the ink supply unit 10. The ink cartridge 20 is installed so that the ink supply needle 31 and the waste ink needle 35 are inserted completely to the ink cartridge 20. Ink is supplied from the ink cartridge 20 to the ink supply needle 31, passes through an ink tube 32, and is delivered to the ink jet head 8. The ink jet head 8 is then driven to eject ink drops from ink nozzles (not shown in the figures) of the ink jet head 8 onto the surface of the printing paper or other print medium transported to the printing position 11.

[0024] When the ink jet head 8 is covered by the capping face 11C of the capping mechanism 11B, an ink pump 33 is driven to suck ink from the nozzles for recovering the nozzles. The waste ink is collected through a waste ink tube 34 and the waste ink needle 35 in a waste ink collection unit 25 (shown in Fig. 4 (B)) inside the ink cartridge 20.

[0025] A schematic view of the internal structure of a typical ink cartridge 20 is shown in Fig. 4 (B). As shown in the figure, the ink cartridge 20 comprises a flexible ink bag 21 in which ink is sealed; a rigid case 23 inside of which is held the ink bag 21; and a waste ink collection unit 25 made from an ink absorbent material. An ink outlet piece 22 is formed in the ink bag 21.

[0026] The rigid case 23 comprises a case body 23a and a case cover 23b. Two needle insertion holes 23d and 23f, and an ink cartridge positioning hole 23e, are provided in the front face 23c of the ink cartridge 20 as seen in Fig. 4 (B). One needle insertion hole 23d is for inserting the ink supply needle 31 into the ink outlet piece 22 from outside the ink cartridge 20. The other needle insertion hole 23f is for inserting the waste ink needle 35 into an opening or an inlet piece(not shown in the figure) of the waste ink collection unit 25 from outside the ink cartridge 20. A detection plate 24 for detecting how much ink remains is attached to a side of the ink bag 21.

Ink cartridge insertion mechanism

[0027] The structure of the ink supply unit 10 incorporated in the ink jet printer 1 is described next.

[0028] Fig. 5 (A) and (B) show the ink supply unit 10 in a state before an ink cartridge 20 is installed. Fig. 6 (A) and (B) show the ink supply unit 10 in a state before and after an ink cartridge 20 is slid to the ink supply needle 31 and the waste ink needle 35 using a sliding mechanism 60. An ink absorption and needle protection device 70 is shown in Fig. 7.

[0029] As shown in the figures, the ink supply unit 10 comprises cartridge loader 30 for holding a replaceable ink cartridge 20. The ink supply needle 31 and the waste ink needle 35 are positioned horizontally as shown in the figure at the same height in the cartridge loader 30, and are enclosed in a hood 40 that is open on the open end side of the ink supply needle 31 and the waste ink needle 35. The device 70 is also contained within the hood 40.

[0030] The device 70 protects the ink supply needle 31 and the waste ink needle 35, and absorbs any ink that may leak from the needles when no ink cartridge is installed.

[0031] The cartridge loader 30 comprises a box-like cartridge holder 50 and a sliding mechanism 60. The cartridge holder 50 is disposed so that it can slide horizontally relative to the hood 40, that is, in the axial direction of needles 31 and 35. The sliding mechanism 60 is used to slide the cartridge holder 50 horizontally.

[0032] This box-like cartridge holder 50 is described first below. On its top the cartridge holder 50 has an opening 51 enabling an ink cartridge 20 to be loaded from above into the cartridge holder 50. As a result, the ink cartridge 20 is inserted into the cartridge holder 50 from a direction substantially perpendicular to the axis of the ink supply needle 31.

[0033] An opening 52d is provided in the front face 52 of the cartridge holder 50 at a position corresponding to the needle insertion holes 23d and 23f in the front face 23c of an inserted ink cartridge 20. A positioning hole 52e likewise corresponding to the positioning hole 23e of the ink cartridge 20 is also provided.

[0034] The sliding mechanism 60 has a guide frame 61 on which the cartridge holder 50 is supported for sliding in two opposite directions. A guide rail 56 formed along the bottom of the cartridge holder 50 fits into and slides inside a rail channel 62 formed in the guide frame 61. A rack 63 is formed facing downward as shown in Fig. 5 on the side of the cartridge holder 50. A pinion 64 engaging the rack 63 is formed on the side of the guide frame 61 in a manner enabling the pinion 64 to pivot freely. An operating lever 65 is formed on one side of the pinion 64 extending substantially radially from the rotational axis 66 of the pinion 64.

Ink absorption and needle protection device

[0035] The device 70 is described next referring primarily to Fig. 7 and Fig. 8.

[0036] As shown in the figures, the device 70 comprises a pivot plate 73, ink absorption material 74, and a pair of torsion springs 75 and 76.

[0037] The pivot plate 73 is disposed so that it can pivot freely on support pins 71 and 72 relative to the side walls of the hood 40. The ink absorption material 74 is a rectangular body affixed to the back (bottom) of the pivot plate 73 as seen in the figures. The springs 75 and 76 apply a resilient force to the pivot plate 73, and thus constantly urge the pivot plate 73 to assume a particular position.

[0038] The pivot plate 73 is made from a rigid material

such as a metal plate or a hard plastic molding. The pivot plate 73 comprises a first part 731 and a second part 732. The first part 731 is substantially horizontal (and will be referred to as the horizontal part hereinafter) when no ink cartridge is installed. In this state the second part 732 (referred to as the inclined part hereinafter) extends at a downward slope toward the opening of the hood 40 from the outside edge of the horizontal part 731.

[0039] Support pin sockets 735 and 736 are formed at the inside end (opposite to the outside edge) of the pivot plate 73 on opposite locations on the lateral sides of the horizontal part 731. The support pins 71 and 72 fit in the support pin sockets 735 and 736, and the pivot plate 73 is thus supported in a manner enabling it to pivot freely.

[0040] Slits 733 and 734 are formed in the horizontal part 731 of the pivot plate 73 at positions corresponding to the ink supply needle 31 and the waste ink needle 35, respectively, and are each sufficiently wider than the outside diameter of the corresponding needle.

[0041] Recessed channels 741 and 742 with a substantially semicircular cross section are formed in the top of the ink absorption material 74 at positions corresponding to the slits 733 and 734. The width and depth of these recessed channels 741 and 742 are also sufficiently greater than the outside diameter of the corresponding one of needles 31 and 35. In an exemplary embodiment of the invention as shown in Fig. 7 and Fig. 8, the channel width and the slit width are the same, but this is not essential to the invention.

[0042] The pivot plate 73 is supported such that the horizontal part 731 is urged to a normally horizontal position by the pair of torsion springs 75 and 76. More specifically, the pivot plate 73 is supported such that the horizontal part 731 is parallel with the ink supply needle 31 and the waste ink needle 35. The height of the pivot plate 73 is set such that the ink supply needle 31 and the waste ink needle 35 are completely received by the recessed channels 741 and 742, respectively, of the ink absorption material 74 as shown in Fig. 7 (B). The length of the slits 733 and 734 and of the recessed channels 741 and 742 is set so that the full length of the needles 31 and 35 can be received therein.

[0043] When the ink supply needle 31 and the waste ink needle 35 are positioned in the slits 733 and 734 and the recessed channels 741 and 742 as shown in Fig. 7, ink leaking from either needle 31 or 35 will be absorbed and collected in the ink absorption material 74. As a result, the position of the pivot plate 73 when the horizontal part 731 thereof is horizontal and ink can be collected by the ink absorption material 74 is referred to below as the "ink absorption position".

[0044] When the pivot plate 73 is pivoted downward against the tension of the springs 75 and 76 to the position indicated by the solid lines in Fig. 8, the ends of the needles 31 and 35 are exposed and removed from the protective cover of the recessed channels 741 and 742 of the ink absorption material 74. As a result, the needles 31 and 35 can be inserted into the needle insertion holes 23d and 23f of the ink cartridge 20. In this "retracted position" of the pivot plate 73 the pivot plate 73 and ink absorption material 74 do not interfere with ink cartridge 20 installation.

Ink cartridge installation

[0045] Referring again to Fig. 5 and Fig. 6, the operation whereby an ink cartridge 20 is loaded and inserted into an ink supply unit 10 according to the present embodiment is described next.

[0046] When the cartridge holder 50 is removed from the hood 40 as shown in Fig. 5 (A) and 5 (B), an ink cartridge 20 can be inserted from above into the opening 51 as indicated by the arrow in Fig. 5 (A). When the ink cartridge 20 is properly seated inside the cartridge holder 50, the needle insertion holes 23d and 23f and the positioning hole 23e in the front of the ink cartridge 20 as seen in Fig. 5 are aligned with the opening 52d and positioning hole 52e in the front of the cartridge holder 50.

[0047] The ink cartridge 20 and cartridge holder 50 are thus positioned as shown in Fig. 6 (A) with the operating lever 65 in a substantially horizontal attitude. When the operating lever 65 is then lifted and turned in the direction of the arrow, the pinion 64 rotates clockwise, driving the rack 63 and causing the cartridge holder 50 and the ink cartridge 20 held therein to slide horizontally towards the ink supply needle 31 and the waste ink needle 35.

[0048] When the ink cartridge 20 and cartridge holder 50 are thus slid forward, the front face 52 of the cartridge holder 50 abuts and then pushes the inclined part 732 of the pivot plate 73 at the front of the device 70. While the pivot plate 73 is normally urged by the torsion springs 75 and 76 into the ink absorption position (Fig. 7), the downward inclination of the inclined part 732 forces the pivot plate 73 to pivot downward against the spring tension as it is pushed by the front face 52 of the cartridge holder 50.

[0049] Pivoting the pivot plate 73 thus exposes the ends of the ink supply needle 31 and the waste ink needle 35, which are normally protected by the ink absorption material 74 and horizontal part 731 of the pivot plate 73. The needles 31 and 35 thus pass through the opening 52d in the front face 52 of the cartridge holder 50 as the cartridge holder 50 slides forward to the needles, and gradually penetrate the needle insertion holes 23d and 23f in the front of the ink cartridge 20.

[0050] When the operating lever 65 has been turned to the vertical attitude shown in Fig. 6 (B), the front face 52 of the cartridge holder 50 contacts a side of the hood 40, and the horizontal ink supply needle 31 and the waste ink needle 35 are inserted completely through the opening 52d and needle insertion holes 23d and 23f into the ink outlet piece 22 and waste ink collection unit 25, respectively. As a result, the ink supply path from the

ink cartridge 20 to the ink jet head 8 is completed as shown in Fig. 4.

[0051] The ink cartridge 20 can easily be removed by simply reversing the above-described operation. That is, the operating lever 65 is rotated from the vertical position shown in Fig. 6 (B) to the horizontal position shown in Fig. 6 (A). This causes the cartridge holder 50 to slide back and out of the hood 40, and exposes the top opening 51.

[0052] Sliding the cartridge holder 50 away from the needles also frees the inclined part 732 of the pivot plate 73, and enables the torsion springs 75 and 76 to urge the device 70 back to the horizontal position. Sliding the cartridge holder 50 back thus allows the device 70 to return to the ink absorption position in which the needles 31 and 35 are protected as shown in Fig. 6 (A).

[0053] The sides of the ink cartridge 20, which are exposed through cut-outs 57a and 57b in the sides of the cartridge holder 50, can then be simply gripped between the fingers and the ink cartridge 20 lifted up and out of the cartridge holder 50.

[0054] It will thus be obvious that the device 70 for the ink supply unit 10 of an ink jet printer 1 according to the present invention protects the ink supply needle 31 and the waste ink needle 35 from being accidentally touched when no ink cartridge is installed while the ink absorption material thereof absorbs any ink that might leak from said needles 31 and 35. It is therefore possible to prevent the area around the ink supply needle from becoming soiled by ink leaking from the ink supply needle during shipping of an ink jet printer.

[0055] As described above, inserting an ink cartridge 20 causes the pivot plate 73 of the device 70 to pivot to a retracted position in which the device 70 does not interfere with insertion and installation of an ink cartridge 20. It is therefore not necessary to provide a separate mechanism for moving the pivot plate 73 between the ink absorption position and the retracted position, and the device 70 can be made compact.

[0056] While the present invention has been described above with reference to an exemplary ink jet printer having both an ink supply needle and a waste ink needle, the invention can also be applied to an ink jet printer having only an ink supply needle.

[0057] Furthermore, while the exemplary embodiment of the invention described above uses an ink cartridge loader to hold and slide the ink cartridge, the present invention can be similarly applied to an ink cartridge insertion mechanism in which the ink cartridge itself is slid without using an ink cartridge loader.

[0058] As described above, an ink cartridge insertion mechanism according to the present invention for use in an ink jet printer comprises a movable ink absorption device for absorbing ink leaking from the ink supply needle when an ink cartridge is not installed. It is therefore possible to avoid problems caused by leaked ink soiling the area around the needle.

[0059] As also described above, the ink absorption means moves automatically to a retracted position in conjunction with ink cartridge insertion. It is therefore not necessary to provide a separate means for moving the ink absorption device, and the ink absorption device can be comprised more compactly compared with an ink absorption device requiring a separate means of being moved. Ink cartridge insertion and removal are also made easier because a separate operation is not required to move the ink absorption device.

[0060] Yet further, the ink absorption device also functions as a means for protecting the ink supply needle when an ink cartridge is not installed. It is therefore possible to compactly dispose a device having both an ink absorption function and a needle protection function.

Claims

1. An ink cartridge insertion mechanism for an ink jet printer, comprising:

   a cartridge receiver (40) having an opening and an ink supply needle (31), wherein an ink cartridge (20) can be inserted through the opening into the cartridge receiver in the axial direction of the ink supply needle so that the ink supply needle enters the ink cartridge,
   an ink absorption device (70) mounted in the cartridge receiver (40) so as to be movable from a first position to a second position in response to an ink cartridge being inserted into the cartridge receiver,
   the ink absorption device (70), in its first position, being arranged to absorb ink that might leak from the ink supply needle when no ink cartridge is installed, and, in its second position, being retracted so as not to interfere with the ink supply needle insertion into the ink cartridge.

2. The mechanism according to claim 1, further comprising means (75, 76) for resiliently biasing the ink absorption device (70) into said first position.

3. The mechanism according to claim 1 or 2, wherein the ink absorption device (70), in its first position, at least partially surrounds at least the tip of the ink supply needle (31) for protecting the ink supply needle when no ink cartridge (20) is installed.

4. The mechanism according to claim 1, 2 or 3, wherein the ink absorption device (70) comprises an ink absorption material (74) and a pivot plate (73) supporting the ink absorption material, wherein the pivot plate is pivotally mounted in the cartridge receiver (40) so as to pivot between said first and second positions.

5. The mechanism according to claim 3 and 4,

wherein the pivot plate (73) has a slit (734) through which the ink supply needle (31) can pass when the pivot plate moves to said first position, and the ink absorption material is attached to the pivot plate and has a recessed channel (741) at a position in registration with said slit for receiving therein the ink supply needle that has passed through said slit.

6. The mechanism according to claim 5, wherein the pivot plate comprises a first part (731) and a second part (732), said first part pivotally mounted at a first side thereof and said second part integrally joined to a second side of said first part, opposite to said first side, and said second part inclined with respect to said first part such that when the pivot plate is in said first position, the second part is inclined downward away from the ink supply needle and towards said opening in the cartridge receiver (40), the free end of said second part forming an engaging part adapted to be pushed by an ink cartridge (20) as the ink cartridge is being inserted thereby to turn the pivot plate (73) from said first to said second position.

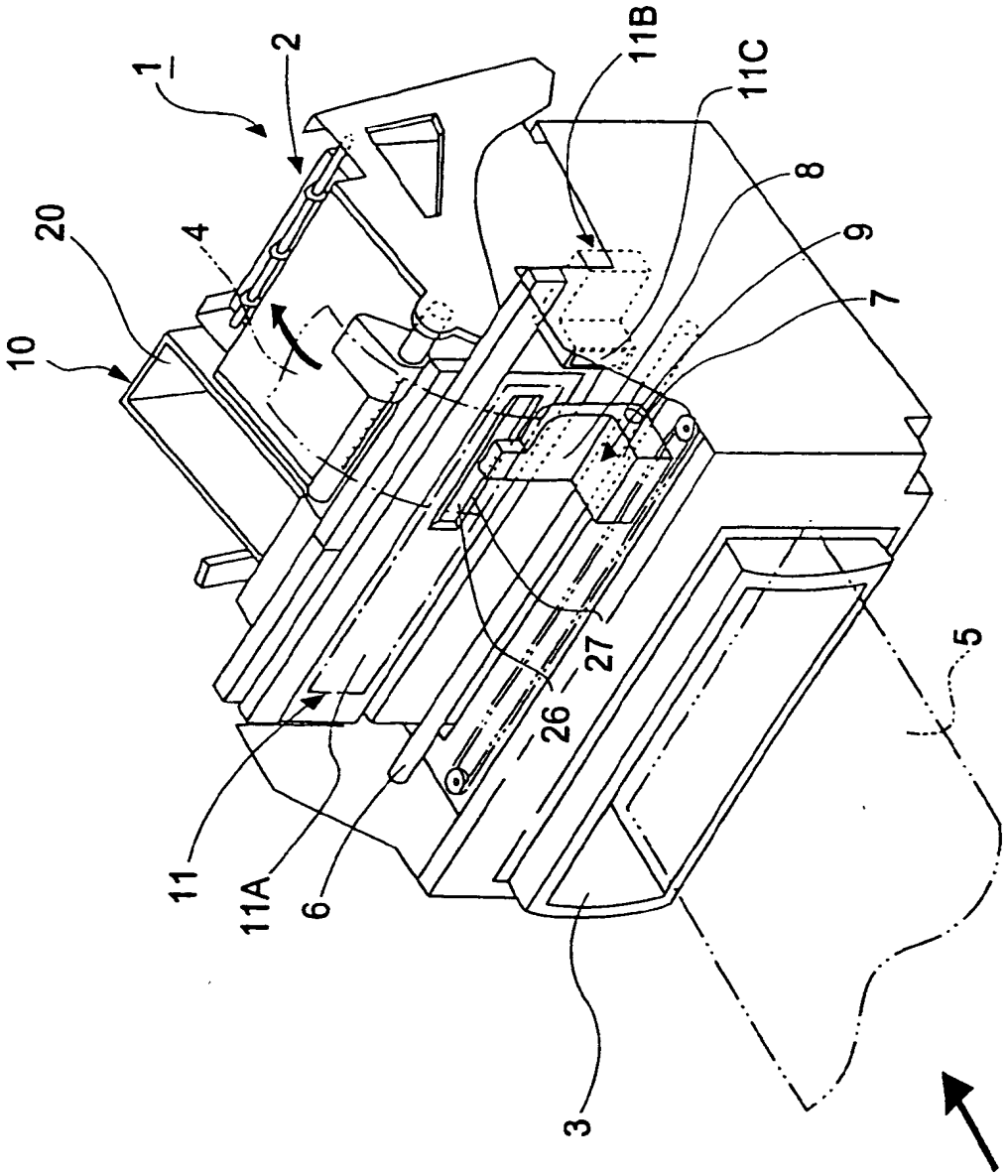

FIG. 1

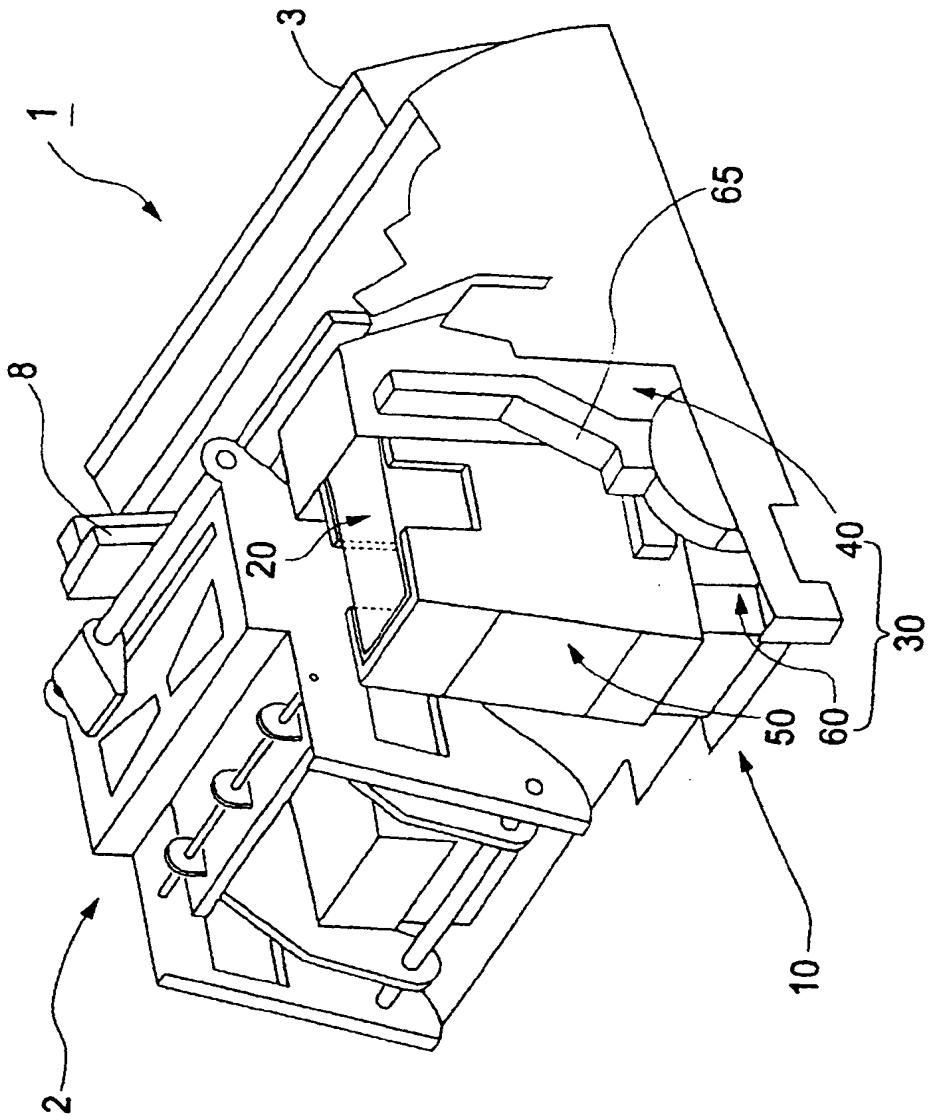

FIG. 2

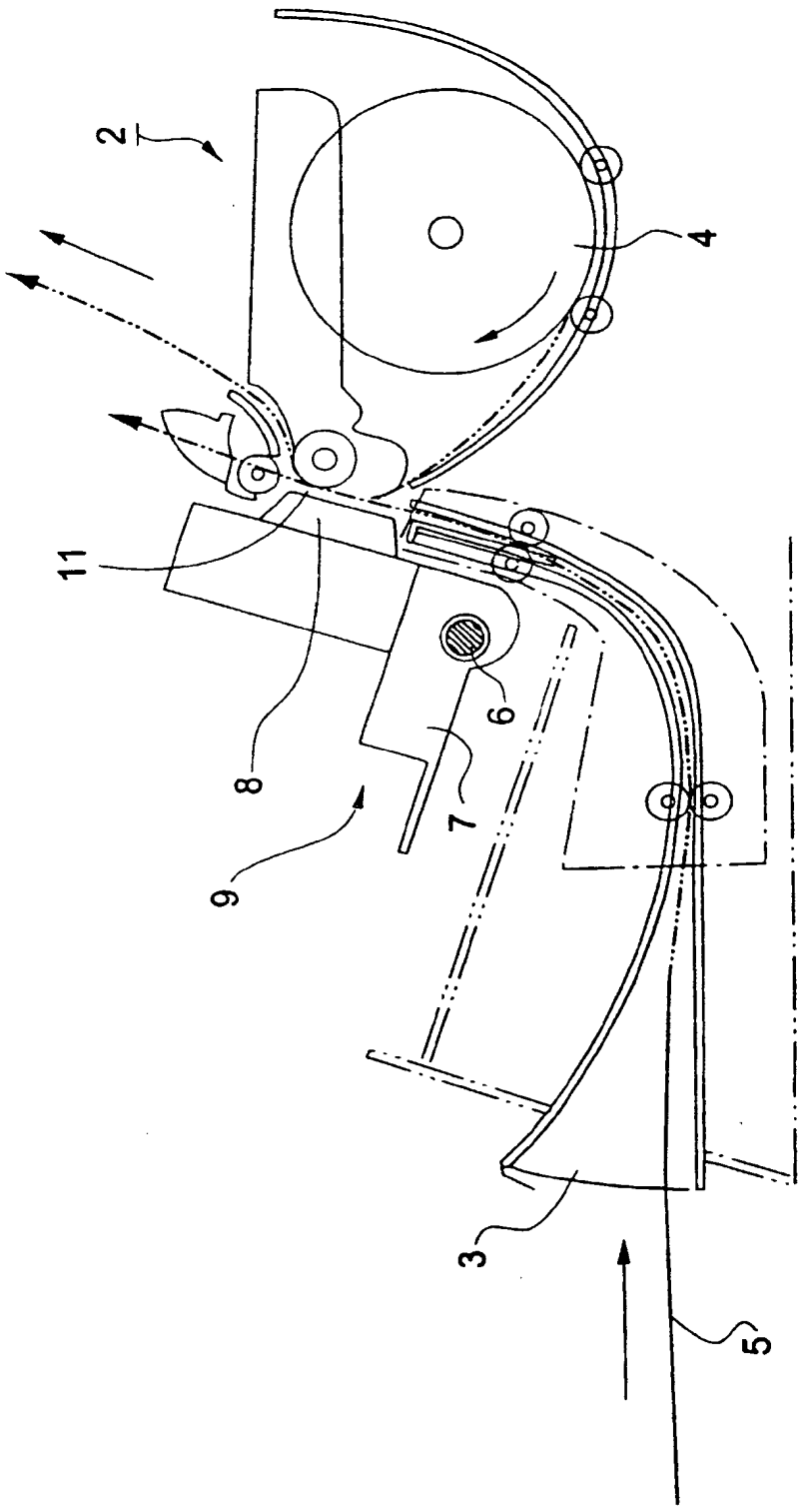

FIG. 3

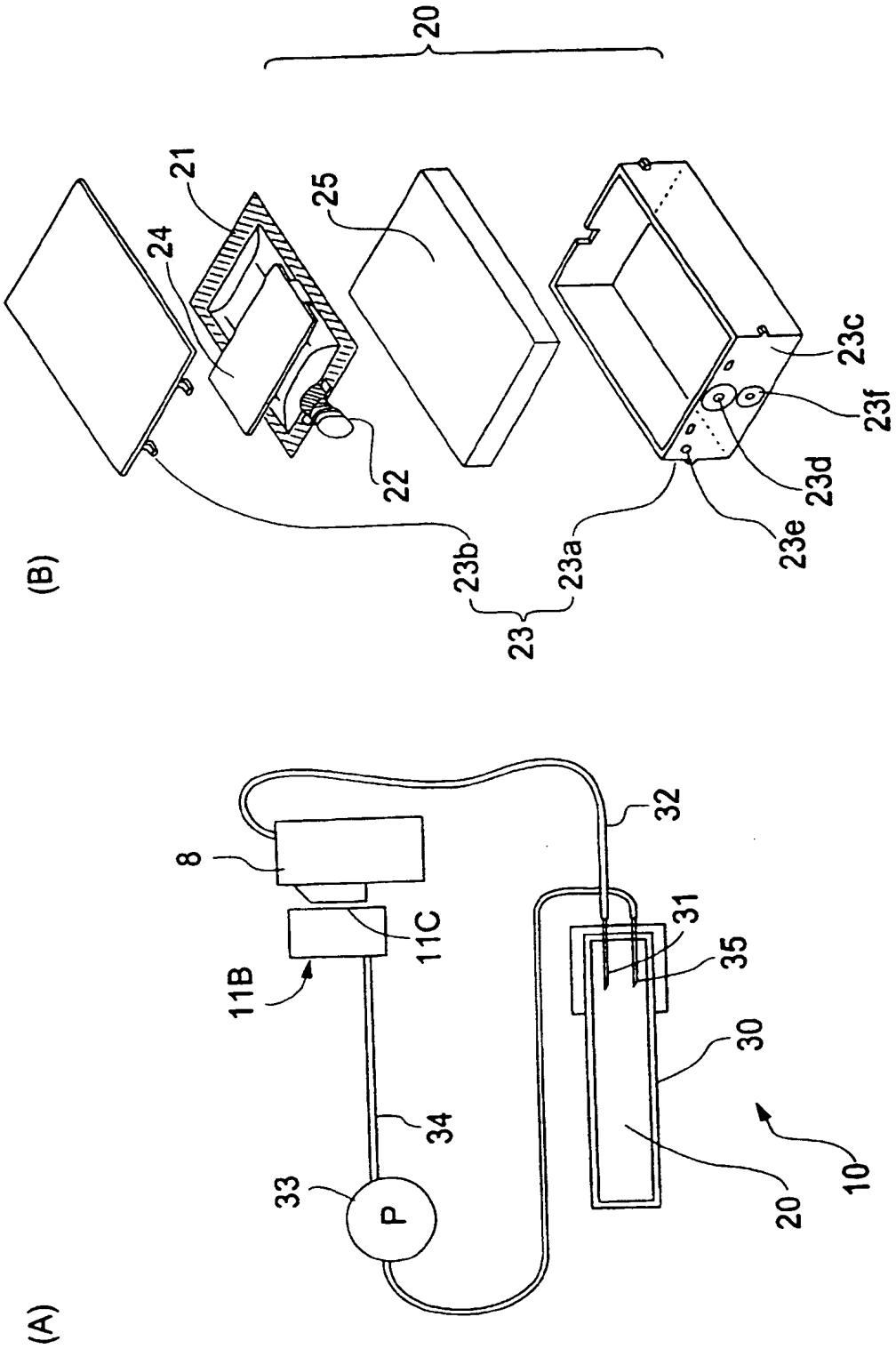

FIG. 4

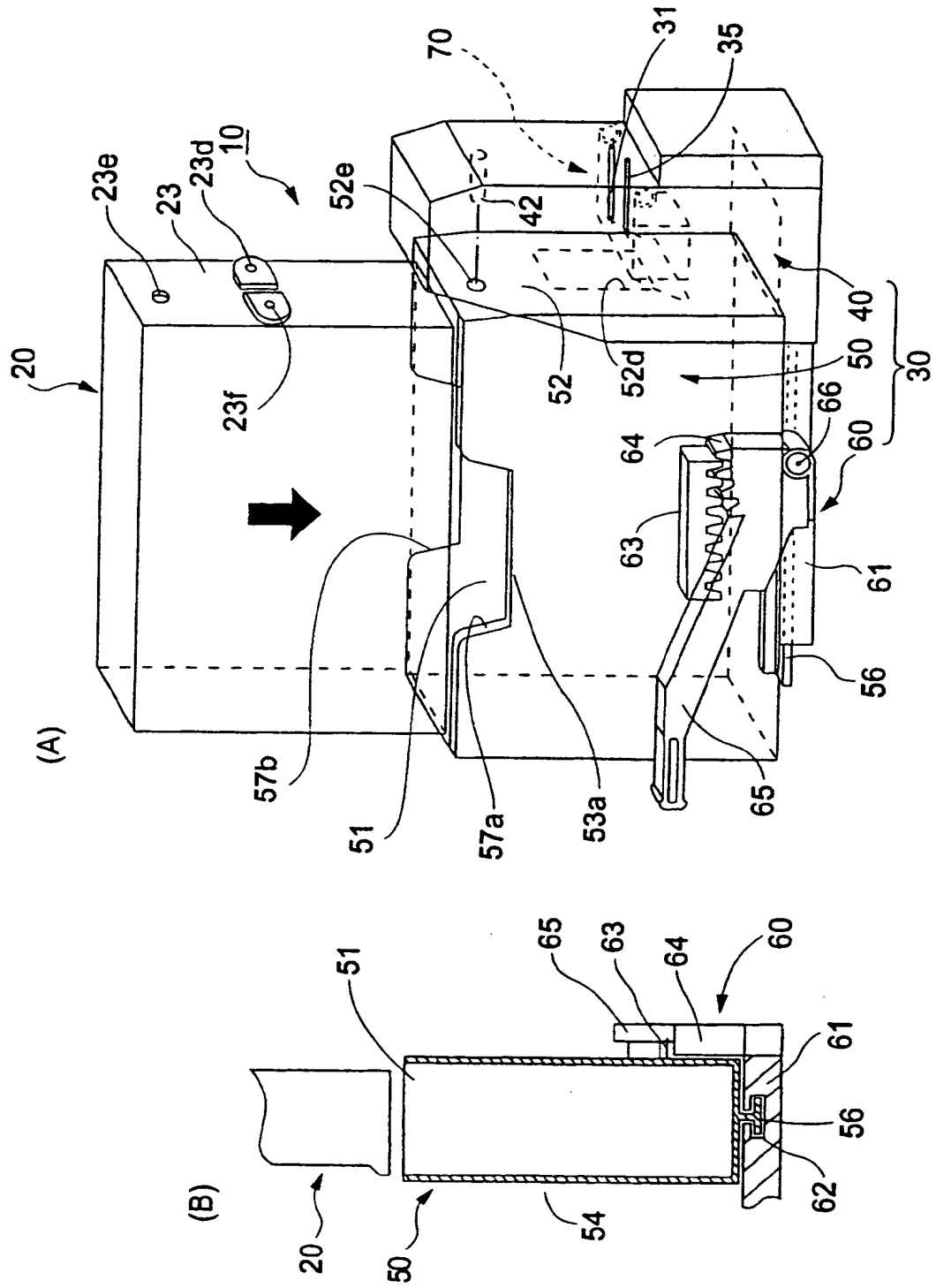

FIG. 5

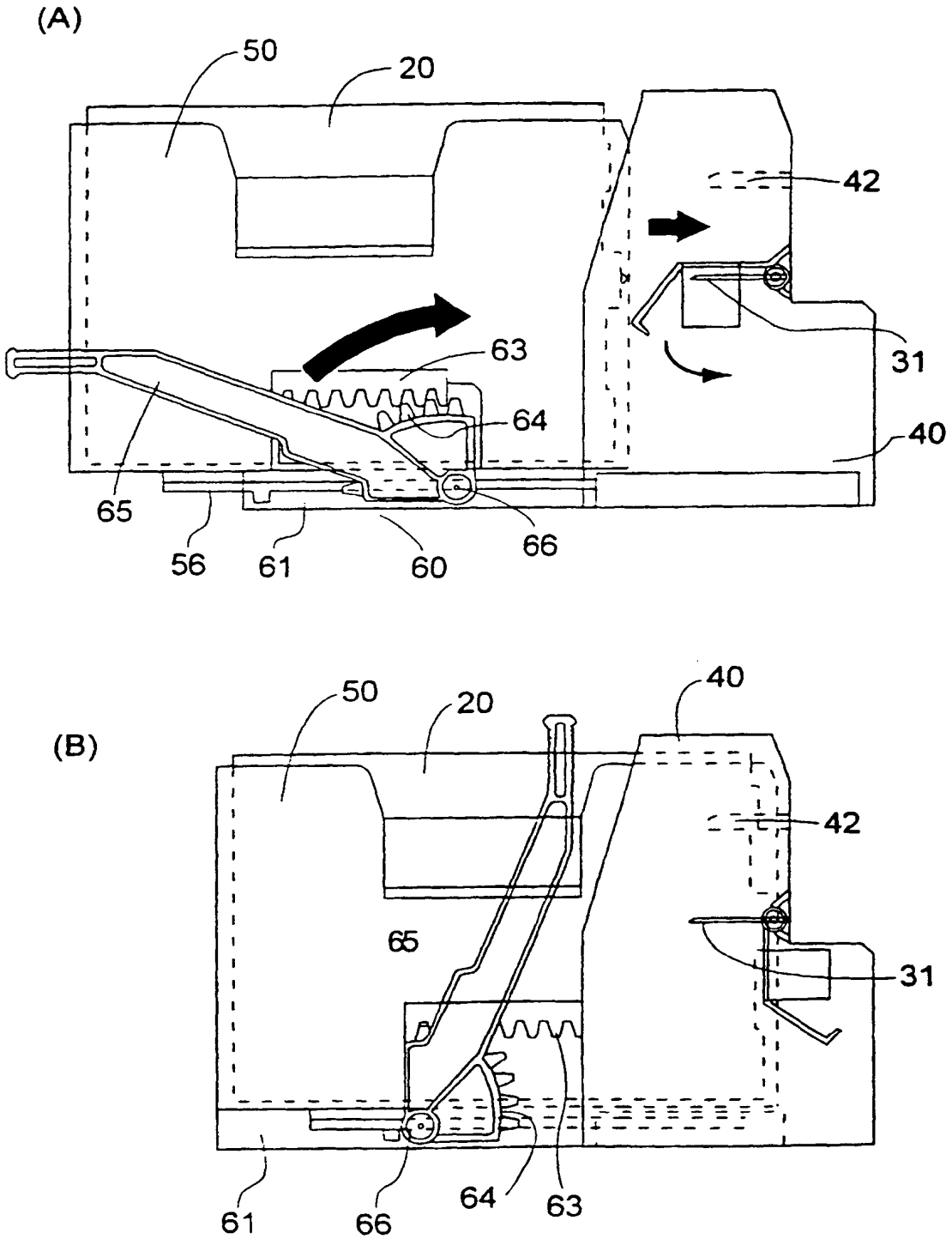

FIG. 6

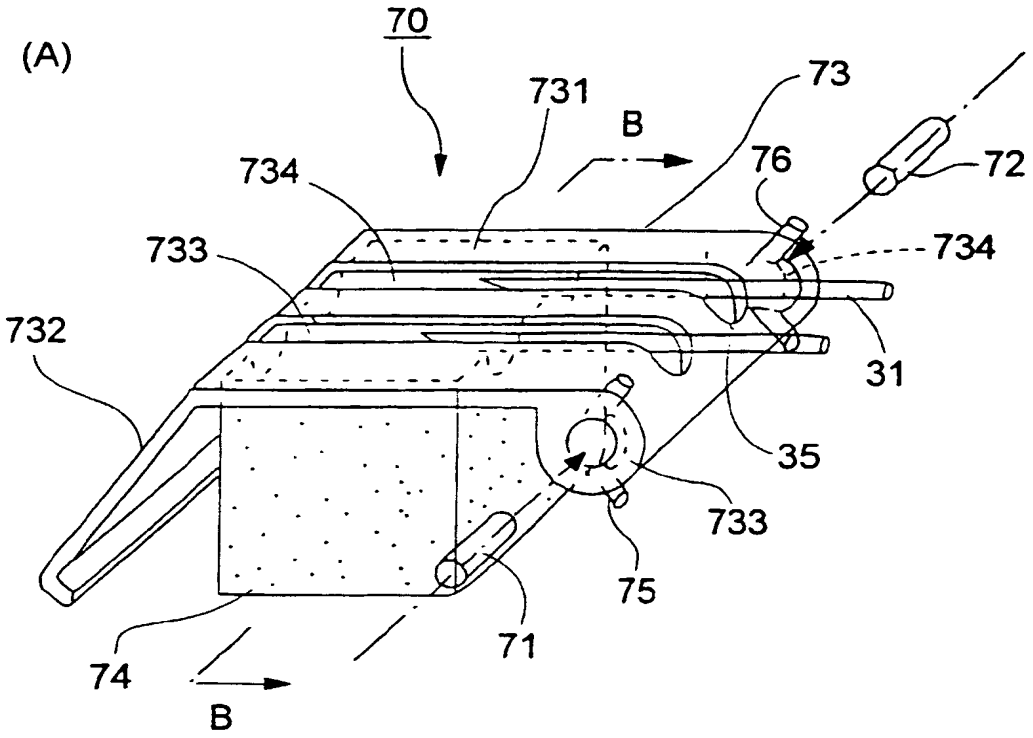

FIG. 7

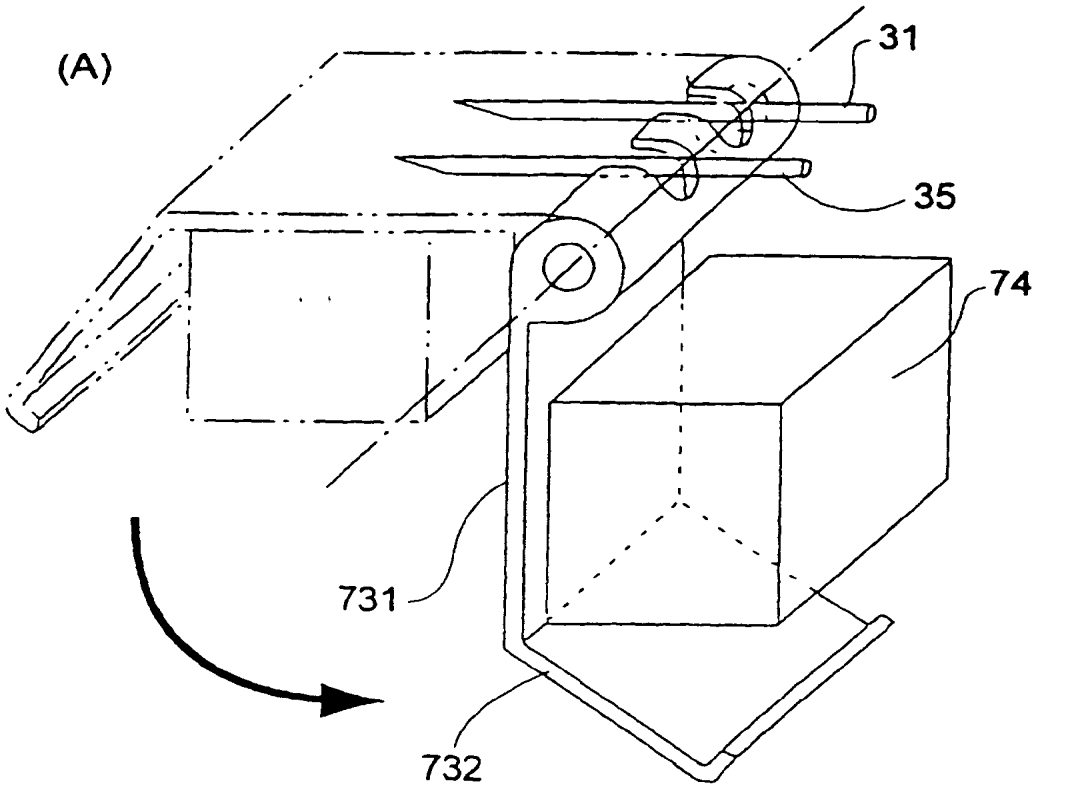

FIG. 8

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(54) Ink cartridge insertion mechanism for an ink jet printer

(57) An ink cartridge insertion mechanism for an ink jet printer is capable of absorbing ink that might leak from an ink supply needle (31) after an ink cartridge has been removed. The ink supply unit of the ink jet printer has an ink absorption and needle protection device (70) including an ink absorption material (74) for absorbing ink leaking from the ink supply needle (31) and/or from a waste ink needle (35) of the ink supply unit when no ink cartridge is installed. The ink absorption material (74) also protects the needles (31, 35). When an ink cartridge is inserted, a pivot plate (73) causes the entire ink absorption and needle protection device (70) to pivot away from the needles (31, 35) to a retracted position, thus exposing the needles and preventing any interference with ink cartridge loading. When the ink cartridge is subsequently removed, torsion springs (75, 76) urge the pivot plate (73) back to the original horizontal ink absorption position.

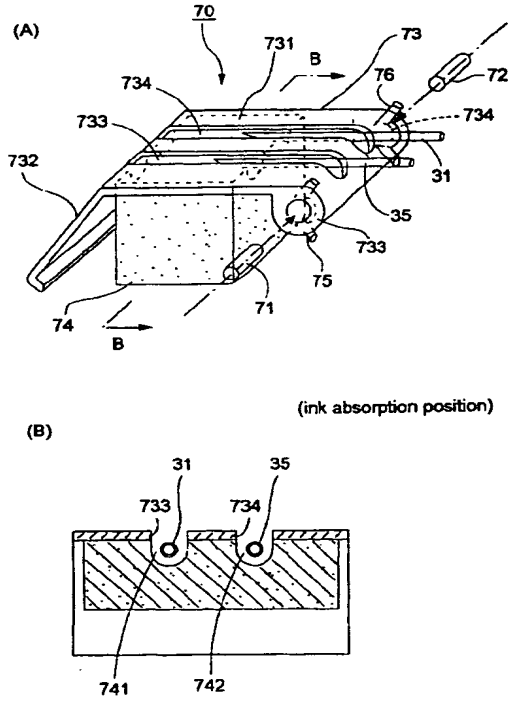

FIG. 7

EP 0 899 111 A3

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EUROPEAN SEARCH REPORT

Application Number
EP 98 11 5975

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22 February 2000	Adam, E

CATEGORY OF CITED DOCUMENTS

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